A Survey of Embodied AI: From Simulators to Research Tasks

Year: 2021 | Citations: 399 | Authors: Jiafei Duan, Samson Yu, Tangyao Li, Huaiyu Zhu, Cheston Tan

---

Abstract

There has been an emerging paradigm shift from the era of “internet AI” to “embodied AI,” where AI algorithms and agents no longer learn from datasets of images, videos or text curated primarily from the internet. Instead, they learn through interactions with their environments from an egocentric perception similar to humans. Consequently, there has been substantial growth in the demand for embodied AI simulators to support various embodied AI research tasks. This growing interest in embodied AI is beneficial to the greater pursuit of Artificial General Intelligence (AGI), but there has not been a contemporary and comprehensive survey of this field. This paper aims to provide an encyclopedic survey for the field of embodied AI, from its simulators to its research. By evaluating nine current embodied AI simulators with our proposed seven features, this paper aims to understand the simulators in their provision for use in embodied AI research and their limitations. Lastly, this paper surveys the three main research tasks in embodied AI – visual exploration, visual navigation and embodied question answering (QA), covering the state-of-the-art approaches, evaluation metrics and datasets. Finally, with the new insights revealed through surveying the field, the paper will provide suggestions for simulator-for-task selections and recommendations for the future directions of the field.